THE YELLOW-EYE MULLET

AGE STRUCTURE, GROWTH RATE AND SPAWNING CYCLE OF A POPULATION OF YELLOW-EYE MULLET *ALDRICHETTA FORSTERI* (CUV. AND VAL.) FROM THE COORONG LAGOON, SOUTH AUSTRALIA

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SUMMARY

The "Coorong mullet" spawns once per year, from January to early April. Males begin maturing a few months before the females are running ripe. Seven stages can be recognized in the gonads of the female and measurements of the diameter of the ova in each stage are given. The smallest fish with mature gonads were found to be 21 cm (males) and 23 cm (females), measuring from the tip of the snout to the caudal fork.

The ages of the fish were determined from a study of otoliths and this method was supported by the Petersen method of analysis of frequencies of lengths. The mean lengths attained by the "Coorong mullet" during their first four years are 14, 21, 26 and 31 cm respectively.

Characteristics of the "Coorong mullet" are compared with both the eastern and western races of the yellow-eye mullet (See Thomson, 1957a; 1957b). It is concluded that the "Coorong mullet" has the characteristics of the eastern race.

INTRODUCTION

The yellow-eye or fresh-water mullet *Aldrichetta forsteri* (Cuvier and Valenciennes) occurs in coastal waters of all Australian States except Queensland. Thomson (1957a) studied the yellow-eye mullet of Western Australia and compared it with those of Victoria and Tasmania. However, very little is known about the rate of growth and spawning cycle of the yellow-eye mullet of South Australia, especially from the Coorong lagoon (see Fig. 1).

The yellow-eye mullet is very common in South Australia, particularly in coastal brackish waters. It is the principal species of mullet sold commercially in this State. The only records of the commercial fishery available during this study were very rough estimates of the total weight of mullet sold in South Australian markets from 1951-62:

1951-52	770,000 lb	1957-58	560,000 lb
1952-53	500,000 lb	1958-59	900,000 lb
1953-54	500,000 lb	1959-60	649,405 lb
1954-55	431,220 lb	1960-61	612,000 lb
1955-56	550,000 lb	1961-62	675,000 lb
1956-57	650,000 lb		

The total weight of mullet handled by the South Australian Fisherman's Co-operative Limited (S.A.F.C.O.L.) from July 1st, 1961 to June 30th, 1962, was 584,984 lb. Approximately 75 per cent of this came from the Coorong lagoon, the other 25 per cent from the shallow coastal waters of South Australia. The fish

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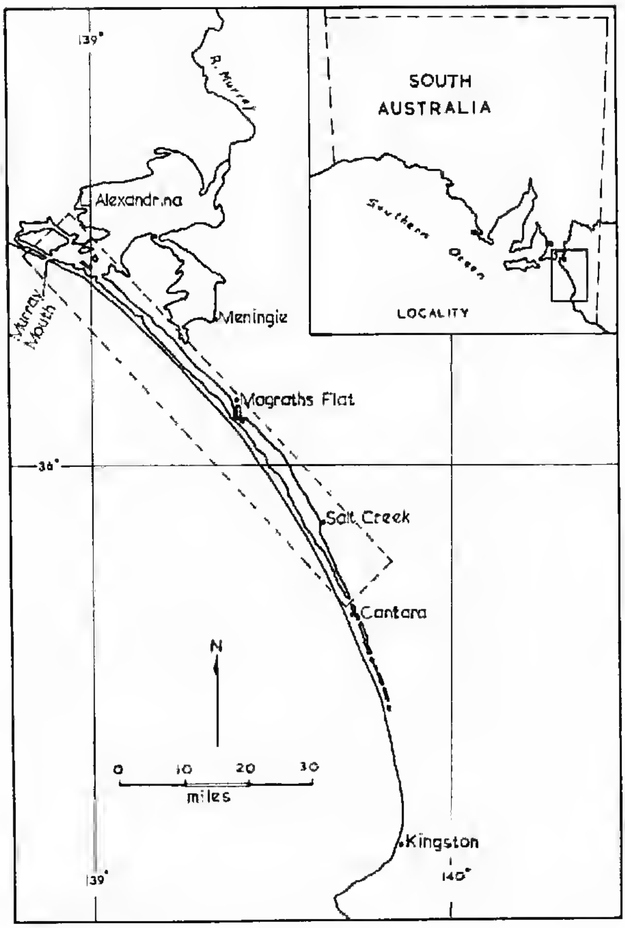

Fig. 1. Location map of the Coorong lagoon.

from the Coorong lagoon and those from the coastal waters are sold under different names at S.A.F.C.O.L. as "Coorong mullet" and "sea mullet" respectively. This investigation only deals with the "Coorong mullet".

The legal minimum length for yellow-eye mullet in South Australia is 7 inches (17·8 cm), total length. As so little is known about the commercial fishery in this state, the effectiveness of the present minimum legal length is open to question. The small amount of data pertaining to fish below 17·8 cm is a deficiency in the present investigation; however, the commercial catch (above 17·8 cm) has been covered as thoroughly as possible in the time available.

THE "COORONG MULLET" FISHERY

The name "Coorong" applies to a long, narrow lagoon and associated shallow lakes, paralleling most of the upper south-east of South Australia. This area is divisible into two sections, the zone of permanent lagoonal water to the north and the shallow, non-perennial lake to the south. In Fig. 1 the lagoon is enclosed by the rectangle. The "Coorong mullet" fishery is only concerned with the lagoon.

The Coorong lagoon extends southwards from the mouth of the River Murray a distance of 68 miles and reaches a maximum width of 2½ miles. The maximum depth reached in winter near Salt Creek is about 14 feet, but the average depth is only 6 feet. The mouth of the Murray provides the only connection between the lagoon and the Southern Ocean. The mouth is about 300 yards in width and consists of a tidal channel through the unconsolidated dunes of Younghusband Peninsula.

Mesh and gill nets are the principal means of catching the "Coorong mullet" and regulations restrict the size of the mesh and the lengths of these nets. The influence that regulations on nets have on the yellow-eye mullet fishery in Western Australia has been discussed by Thomson (1957a). Regulations during the period of this investigation restricted the length of any net to 60 yards, the length of mesh nets to 35 yards and the size of the mesh used in all nets to not less than 2 inches.

The "set net" is by far the most common method used for catching mullet. Lengths of mesh or gill nets are anchored to stakes across the current. They are checked at regular intervals and the "gilled" fish collected. "Ring netting" is often used with great success on calm, still nights. The fisherman lays a net, one end of which is attached to a buoy, around a school of fish. A few fishermen use beach seine nets from sandy beaches or sand bars. Unfortunately, these beaches are rare due to the rocky nature of the bottom. During the summer months sand banks are exposed in the centre of the lagoon and from these banks beach seining is very successfully carried out. Most of the mullet from the lagoon is sent to Meningie to be packed in ice prior to transport to S.A.F.C.O.L.

SAMPLING METHODS

Weekly samples of "Coorong mullet" were collected from S.A.F.C.O.L. Adelaide market for one year from February, 1962 to January, 1963. Over 100 fish were selected at random each week; and their lengths were measured by puncturing holes in a celluloid strip, mounted on a centimetre rule, with a bootmaker's awl (see Scott, 1954). From this random sample approximately 12 fish were chosen, representing the complete range of sizes of fish available, for further detailed examination in the laboratory.

This detailed examination consisted of: (a) collecting scales and otoliths and storing them in labelled envelopes, and (b) macroscopic examination of the gonads, after which they were fixed in 5 per cent formalin for microscopic examination.

On one occasion on October 7th, material was obtained from the Coorong lagoon by seine netting in shallow water with a net of 1 inch mesh. Only 31 fish ranging from 5·5 cm to 15·8 cm were caught.

During the year the lengths of 6,054 fish were measured and 631 otoliths were examined in order to determine their age and rate of growth. In addition, the macroscopic and microscopic conditions of about 600 gonads were noted. All measurements of lengths were taken from the tip of the snout to the caudal fork (L.C.F.) unless otherwise stated.

DETERMINATION OF AGE BY MEANS OF OTOLITHS

Otoliths were found to be a good index of age and were easy to handle and examine. Both otoliths in any one fish were found to be identical. No preparation prior to the reading of them was required (see Dakin, 1939). Regular opaque bands and translucent bands are obvious even in the largest otoliths. The two otoliths collected from each fish were read together using a low power binocular microscope.

As the otolith bands are formed by regular concretions (Hickling, 1931), the alternate opaque and translucent zones must at some stage actually constitute the margin of the otolith. All the otoliths collected from each weekly sample of fish were placed into two groups, those in which an opaque band constituted the margin and those in which a translucent band constituted the margin. Transitional or doubtful ones were discarded and these accounted for about 20 per cent of the otoliths. The occurrence of opaque margins was plotted as a percentage of all otoliths examined during each month of the year from February, 1962 to January, 1963. The results are shown in Fig. 2.

Fig. 2 shows that the lowest percentage of otoliths with opaque margins occurs during August and September while the highest percentage occurs in January. Translucent bands occur during the winter months and opaque bands form during the summer months. A similar condition was observed for garfish in South Australia by Ling (1958), for plaice (Molander, 1947) and for the tiger flathead (Dakin, 1939; Fairbridge, 1951). Thomson (1957b), has shown that the annuli in the scales of the yellow-eye mullet from both Western and Eastern Australia are formed when growth recommences after the winter cessation.

The first translucent band is laid down during the first winter, approximately 6 months after spawning. The first opaque band is laid down during the first summer after spawning. Hence, the number of opaque bands represents the actual

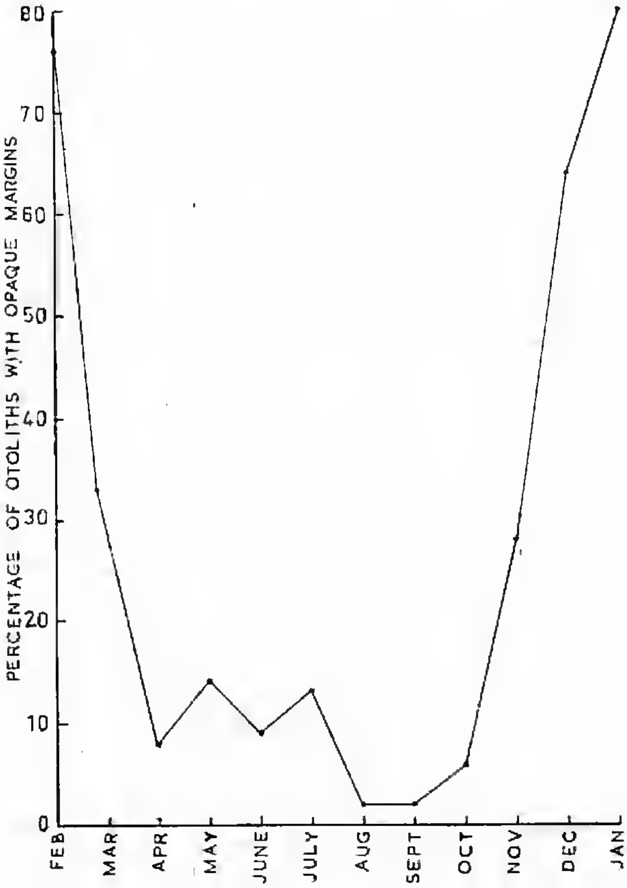

Fig. 2. Monthly percentage incidence of otoliths with opaque margins for the 12-month period February, 1962 to January, 1963.

age of the fish in years. For this reason the opaque zones were counted and the age groups denoted as 0+, 1+, 2+, etc., the numbers representing the age of the fish in years and the + — sign signifying an additional unknown number of months (but less than 12) above the preceding numbers. The results of the otolith readings are given in Table 1. The number of fish in each age group are arranged with their corresponding lengths.

Ling (1958) discusses in great detail the ways of confirming the otolith method as a means of determining the age of fish. He discusses Graham's original five tests to validate the scale method (Graham, 1929). In this investigation Petersen's method of interpreting the modes of a graph of length distribution as the model lengths of successive age groups is used to support the data obtained from otoliths.

Monthly histograms of the frequencies of lengths of fish measured each week by the celluloid strip method (see Scott, 1954) are shown in Fig. 3. In the majority of histograms a definite mode occurs about the lengths of 20-22 cm, a less

TABLE 1

Length frequencies of males and females with their ages, as determined from otoliths, for all fish examined in the laboratory from February, 1962 to January, 1963.

Age groups	Male				Female					
Length (cm)	0+	1+	2+	3+	0+	1+	2+	3+	4+	5+
5	1				1					
6										
7	1				2					
8					3					
9										
10										
11		1								
12						1				
13		2				2				
14		5				6				
15		2				4				
16										
17						1				
18							1			
19			7				7			
20			30				19			
21			46				30			
22			30	3			38	1		
23			9	3			40	3		
24			2	14			8	10		
25			1	10				36		
26				5				39		
27								27	1	
28								17	3	
29								6	3	
30				1				2	2	
31									11	
32									5	
33									7	
34										
35										2
Total	2	10	125	36	6	14	143	141	32	2

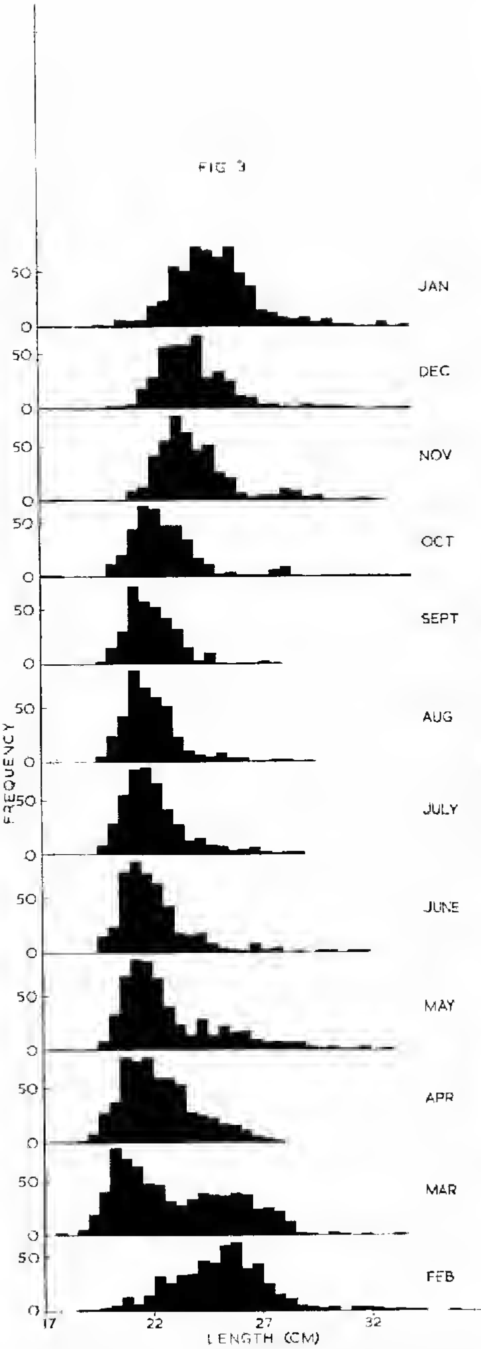

Fig. 3. Monthly frequency distribution of lengths of fish sampled each week for the 12-month period February, 1962 to January, 1963.

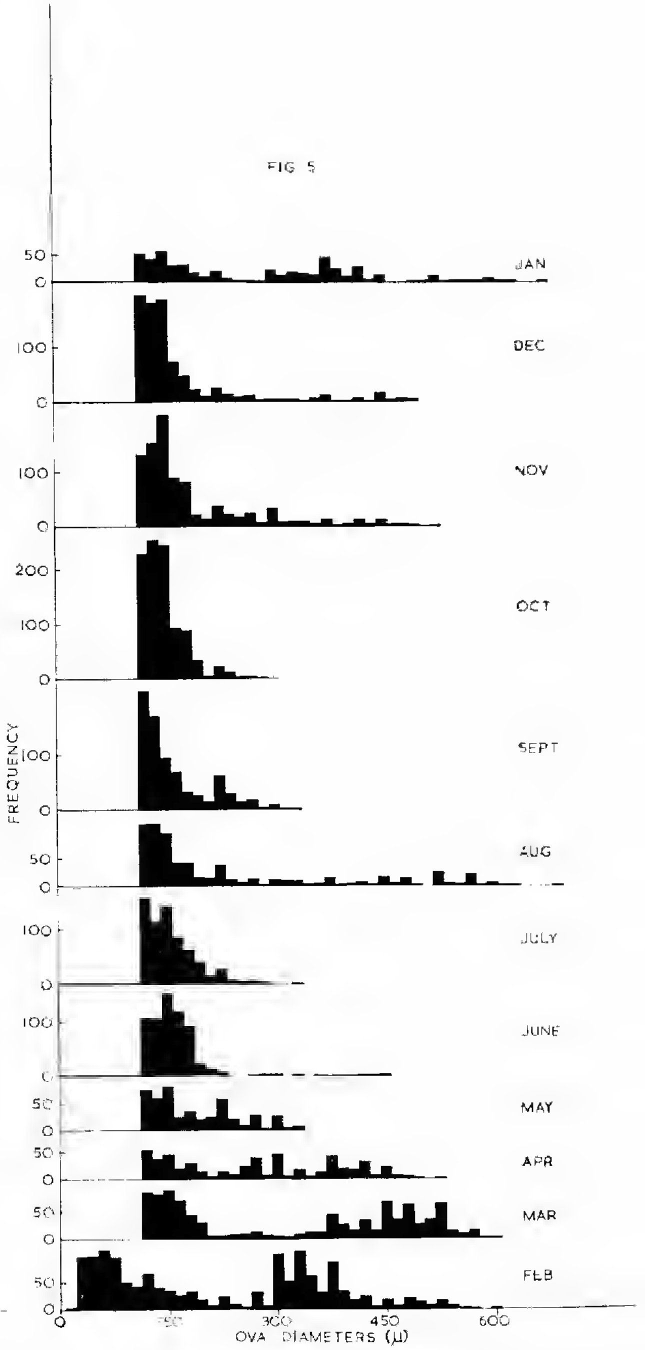

Fig. 5. Monthly frequency distribution of diameters of ova examined from fish selected at random over the 12-month period February, 1962 to January, 1963. (Note: Hickling's "reserve fund eggs" were only measured in February).

definite one about 24-26 cm, and the trace of a third mode about 30-32 cm. By comparison with the different age groups obtained using otoliths, these modes correspond to the age groups 2+, 3+ and 4+ respectively. Therefore, agreement between the Petersen method and the determination of age by means of otoliths is quite good. It can be seen that the majority of fish are in the age group 2+ with a smaller number in the age group 3+ and very few in the age group 4+.

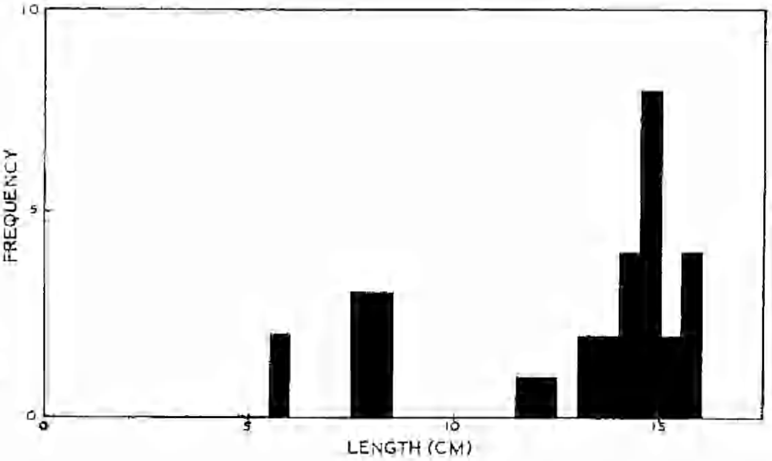

Fig. 4. Frequency distribution of lengths of fish caught October 7th with a net of 1 in. mesh.

Fig. 4 shows the length frequency histogram of 31 fish caught on October 7th with a net of 1 inch mesh. Only one mode at 15 cm is obvious, but probably there is one at 8 cm. These modes correspond to the age groups 0+ and 1+ respectively. In general, it may be stated that the determination of age by means of otoliths is supported by the results of the Petersen method.

RATE OF GROWTH

(a) *Using otoliths and measurements of length*

Table 1 shows the frequencies of lengths of males and females with their ages, as determined from otoliths, for all fish examined in the laboratory from February, 1962 to January, 1963. An analysis of these results was carried out to test the two null hypotheses implicit in these results: (1) that there is no difference in the lengths of the fish in the age groups 0+ and 1+, 1+ and 2+, 2+ and 3+, 3+ and 4+, and (2) that there is no difference in the lengths of a male and female in the age groups 0+, 1+, 2+ and 3+. These null hypotheses were tested by the "t" test (Snedecor, 1956). The first null hypothesis was disproved for all cases, but the second null hypothesis was not disproved for all cases. The differences between the lengths of male and female fish in groups 0+ and 1+ were not significant, but those for groups 2+ and 3+ were highly significant.

The mean lengths attained by the female "Coorong mullet" during their first four years are 14·2, 21·7, 26·1 and 30·9 cm respectively. Rapid growth occurs during their first two years, but then falls off during their third and fourth years. The mean lengths attained by the males during their first three years are 13·7, 21·1 and 24·5 cm respectively. Growth is again rapid during their first two years, but during their third year the mean length attained is 1·6 cm less than that of the females. After the first two years, the rate of growth of males (using only length as the measure of growth) is much slower than that of females.

The two largest fish examined during this study were both females, approximately 35 cm long. Only one male fish examined was found to be longer than 26 cm and it was 30 cm in length. These data indicate that the females grow to a larger size than the males.

(b) *Using the Petersen method*

As mentioned earlier, the histograms of frequencies of lengths given in Fig. 3 show two definite modes occurring about the lengths of 20-22 cm and 24-26 cm with perhaps the trace of a third one about 30-32 cm. These modes are considered to correspond to the age groups 2+, 3+ and 4+ respectively. The evidence for modal progression when following the progress of one particular mode in the course of time is very good.

If March is taken as the time that spawning activity is at its peak, the histogram for March may be said to represent the frequencies of lengths at the beginning (or end) of one or more complete years in the life-cycle of the fish. Definite modes occur about the lengths 20·5, 24·5-26 and 30·5 cm respectively in the March histogram. It is easy to trace the mode about 20·5 cm throughout the year. In April and May, just prior to winter, a small amount of growth is apparent. In May the mode is obvious about 21·5 cm. Over the winter months June to September this mode about 21·5 cm is maintained, indicating no growth, or very little (as also indicated by the study of otoliths). From October to January the mode shifts rapidly from about 22 cm in October, to 23·5 cm in November, 24·5 cm in December and 24·5-26 cm in January. The histogram for February of the previous year shows a very good mode about 26 cm and supports the evidence for modal progression over one year being approximately 20·5 to 26 cm. This corresponds to a growth of 5·5 cm which is very close to the annual growth of a 2-year-old "Coorong mullet" as suggested by the study of their otoliths. Over the same time period possibly the mode about 24·5-26 cm gives way to modes about 28·5 cm in October and November, 29·5 cm in December and 30·5 cm in January. This corresponds to a growth of 4·5-6 cm which is roughly equivalent to the rate of growth of a 3-year-old fish as suggested by the study of otoliths.

THE SPAWNING CYCLE

The methods by which the spawning cycle may be studied include a survey of the seasonal variations in the conditions of the gonads. This involves a macroscopic examination of the appearance of the gonads and a microscopic examination of the ova.

In most investigations (Clark, 1925; Fairbridge, 1951; Scott, 1954) the female cycle has been studied in more detail than the male cycle. In the present investigation the male cycle was examined in less detail because it was found hard to distinguish the stages of the testes and because the condition of the ovaries changed much more noticeably than that of the testes. A month by month comparison of the macroscopic conditions of the ovaries was noted and this was later correlated with a microscopic examination of the ova, including measurements of their size.

(a) *Macroscopic examination of gonads*

Hjort's classification of the gonads of herring (Hjort, 1910) has been adopted with certain modifications to suit this particular species. Seven stages in the ovaries of the "Coorong mullet" were distinguished while the testes were distinguished only as immature or mature. The classification of each of these seven stages of the ovaries is given in Table 2.

TABLE 2

Lengths and stage of maturity of 348 females sampled during January, 1963.

Length (cm)	Stages of ovaries				
	Immature	Adolescent	Maturing	Spent	Per cent maturing and spent
19	2				0
20	2	2			0
21	2	2			0
22	3	2			0
23	12	18	2		16
24	15	55	25	1	27
25	13	43	50		47
26	3	21	26	3	49
27		2	17		89
28		3	4	3	70
29			9		100
30			5		100
31			3		100
Total	52	148	141	7	43

Stage I. Immature virgins. Ovaries small, thread-like and translucent.

Stage II. Adolescent. Ovaries larger, walls taut, extending half-way into the body cavity.

Stage III. (a) Maturing virgins or (b) recovering or resting (spent) fish. Colour ranges from pink at early pigmentation to dark red at a later stage. In (a) walls of ovaries are taut but in (b) walls are flaccid. Ovaries extend further into body cavity.

Stage IV. Maturation continuing. Ovaries larger, red-yellow in colour. Walls taut and not quite transparent so that eggs can only be seen with difficulty after cutting the wall.

Stage V. Mature. Ovaries greatly enlarged from stage IV, occupying the whole of the body cavity. Yellow-orange in colour, walls taut and transparent with eggs clearly visible.

Stage VI. Running-ripe. Yellow-orange in colour with large eggs being extruded when slight pressure is applied to the abdomen.

Stage VII. Spent. Ovaries dark red and flaccid. This stage eventually passes into stage III from which it is hard to distinguish.

The seasonal changes in the gonads may be summarized as follows. The testes of the immature fish are white, thin bodies, triangular in section. During maturation they become thicker and rounder, protruding further into the body cavity and milt being exuded if the walls are ruptured. During the months of May, June and July no mature testes were noticed. For the rest of the year there were always a few mature testes present and during the spawning season January to March, over 50 per cent of all testes examined were mature. (See Table 3 for the percentage of maturing males during January).

When the investigation started in February, 80 per cent of the ovaries examined were mature (stages IV, V and VI) with 25 per cent of these being in the "ripe" condition (stage VI). During March a similar set of conditions continued with a few spent ovaries (stage VII) becoming apparent. However, during April and May spent ovaries became more evident and the last mature ovary (stage VI) was found on April 11th, except for one ovary at stage V found on May 2nd which appeared to be abnormal, only one branch having developed.

During the months of June and July, except for one fish on July 25th which was at stage IV, all ovaries were classified as belonging to stages II and III. Approximately 85 per cent of the ovaries examined during August, September and October were at stages II and III. Only 15 per cent were more advanced than stage III and it is possible that they were early spawners. During November and December, however, ovaries at stage IV became more evident with an occasional stage V until in January ovaries at stage V were common with several at stage VI. (See Table 2 for the percentage of maturing females during January.)

(b) *Microscopic examination of ovaries*

Several ovaries chosen at random, were set aside each week, preserved in 5 per cent formalin and stored in labelled vials. These ovaries were examined under the microscope at a later date.

To measure the diameter of the ova a small piece of ovary was teased out onto a microscope slide, mounted in 5 per cent formalin and covered with a cover slip. The diameters were measured using a micrometer eye-piece and a microscope.

All eggs were measured along whichever axis of the egg lay parallel to the cross-hair of the micrometer eye-piece. Clark (1925) has shown that this method gives a reliable estimate of the frequencies of diameters of the ova. Throughout the investigation group A eggs were not measured, except in February, as they were far too numerous in all of the ovarian stages.

Consistent with the classification of Hickling (1930) and other workers, the ova of the "Coorong mullet" were classified into four groups.

Group A — Immature ova. Very small, angular and colourless with nucleus clearly visible. They are Hickling's "reserve fund eggs" and measure up to 120 μ.

Group B — Maturing ova. The smallest eggs in this group are becoming round and opaque due to accumulation of yolk granules, while the largest ova are quite round and opaque. Size varies from 120 μ to 255 μ.

Group C — Mature ova. Large round opaque ova, pale yellow. Size varies from 255 μ to 380 μ.

Group D — Ripe ova. Very large round opaque ova, yellow. Size varies from 380 μ to 600 μ. This stage merges with group C, but is distinct from group C by size and coloration.

The microscopic characters of each ovarian stage were established as follows:

Stage I. The ova are all typically group A, with none larger than 60 μ.

Stage II. As for stage I, but an occasional ova of group B may be present No ova larger than 135 μ.

Stage III. Ova of groups A and B are very numerous with an occasional group C. Usually no eggs larger than 255 μ.

Stage IV. Ova of groups A, B and C are numerous but group B is usually more numerous than group C.

Stage V. Ova of groups A, B and C are numerous with a few of group D. Group C is usually more numerous than groups B and D.

Stage VI. As for stage V, but the ovaries are much larger with ova of group D most numerous and lying free in the lumen. Groups A, B and C are confined to a layer inside the ovary wall.

Stage VII. Ova of groups A and B are both numerous. An occasional group D ovum is present undergoing breakdown.

The frequencies of diameters of the ova examined were plotted as monthly histograms and are shown in Fig. 5. Throughout the year there is a residue of Hickling's "reserve fund eggs" which were too numerous to measure every month and are shown only in the February histogram. From Fig. 5 it can be seen that numerous ova of group B also are present throughout the year. From May to October (except in August when the ovary examined may have been that of an early spawner) ova of groups A and B are by far the most numerous. During November, however, an increase in the diameter of the ova present is obvious. As maturation continues through December, the diameters of the ova continue to increase until "ripeness" (stage D) is obtained. Ripe eggs are present in greatest numbers during March, with large numbers also present in February and April. Spawning is thus at its greatest intensity during late summer. A sharp drop in the overall diameter of the ova marks the spent and recovering stages, during April and May. It is followed by a period of quiescence from June to October.

SIZE AND AGE AT FIRST MATURITY

The gonads of 122 male and 348 female fish were examined; and their lengths taken, during visits to S.A.F.C.O.L. in January, 1963. The females were classified arbitrarily as immature (stages I and II), adolescent (stage III), maturing (stages IV, V and VI) and spent (stage VII). The males were classified under two divisions, immature and maturing. Tables 2 and 3 show the lengths and stages of maturity of these males and females.

Table 2 shows that 15 fish with lengths of less than 22 cm were examined and none showed signs of maturing. Sixteen per cent of the fish 23 cm in length were maturing and spent. The percentage rose to 100 per cent for all fish 29 cm and above. Females, therefore, do not reach maturity before 23 cm.

Table 3 illustrates that only 3 males 21 cm long were examined and that one of these was maturing. Because so few fish of this length were examined it cannot be proved that males mature at 21 cm. However, 19 fish of length 22 cm were examined and of these fish 42 per cent were maturing. Males, consequently, are definitely mature by 22 cm.

TABLE 3

Lengths and stage of maturity of 122 males sampled during January, 1963.

Length (cm)	Stages of testes		
	Immature	Maturing	Per cent maturing
20	4		0
21	2	1	33
22	11	8	42
23	22	29	57
24	11	24	69
25	1	7	87
26		2	100
Total	51	71	61

Correlating the lengths at which the females and males first mature with the data obtained from the otoliths, it is concluded that the "Coorong mullet" attain maturity during their third year.

DISCUSSION

The "Coorong mullet" grows to a relatively small size of 35 cm. At first the growth, using only length as a measure of growth, is rapid. The mean lengths attained during their first and second years are 14 and 21 cm respectively. After this period, however, there is a marked slowing down in growth reaching a mean length of 26 and 31 cm during their third and fourth years respectively. This slowing down is more pronounced in the males which do not grow as large as the females.

TABLE 4

Lengths (cm) attained each winter average by the Western and Eastern races of theYellow-eye Mullet (Thomson, 1957b) and the mean lengths attained by the "Coorong mullet" over an equivalent time period.

Year	Western and Eastern races	I	II	III	IV	V	VI	VII
	"Coorong mullet"	0+	1+	2+	3—	4+		
Western fish		11	18-19	24-25	29-32	32-35	38	39
Eastern fish		5	12-13	19-21	24-27	30		
"Coorong mullet"		7(?)	14	21	26	31		

Table 4 compares the growth of the western and eastern races of the yellow-eye mullet with that of the "Coorong mullet". The data for the western and eastern races is taken from Thomson (1957b). The year-classes designated in Thomson's paper refer to the length attained each winter average (the western stock being winter spawners). Over an equivalent time interval the "Coorong mullet" grows to a mean length of 7(?), 14·2, 26 and 31 cm by their first, second, third, fourth and fifth winters respectively. It can be seen that their growth rate agrees closely with that of the Victorian and Tasmanian yellow-eye mullet which comprise the majority of fish referred to as "eastern" by Thomson (1957b). The "Coorong mullet" grow at a slower rate than the Western Australian yellow-eye mullet and do not become as large.

The spawning period lasts for 3-4 months from January to early April. This proves that the "Coorong mullet" have the characteristics of the eastern race rather than the western race of yellow-eye mullet (see Thomson 1957b, p. 12). Spawning probably takes place in the Coorong lagoon which would provide a very productive area in which the newly hatched fish can grow rapidly with little chance of a shortage of food occurring. The largest ova of the "ripe" fish were approximately 600 μ in diameter which is relatively small compared with whiting 980 μ (Scott, 1954) and garfish 3,500 μ (Ling, 1958).

The smallest fish recorded with mature gonads were 23 cm for females and 21 cm for males. They mature during their third year or by their third winter. The "Coorong mullet", therefore mature a little earlier and at a slightly smaller size than the Western Australian yellow-eye mullet studied by Thomson (1957a). In addition, due to the spawning periods of the two races of fish occurring at different times of the year, the summer spawning "Coorong mullet" reach maturity faster than the winter spawning western race.

Comparing the commercial catch of "Coorong mullet" with the catch of yellow-eye mullet in Victoria, some interesting facts emerge. In Victoria the fish reach the minimum legal length, 9½ inches total length (21·3 cm L.C.F.), from 2½ to 5½ months prior to spawning (Thomson, 1957a). In South Australia the minimum legal length is 7 inches total length (15 cm L.C.F.) and the fish attain this size approximately 12 months before they have spawned for the first time. South Australia's minimum legal length is obviously too small and at first glance the "Coorong mullet" fishery appears to be in jeopardy. However, Fig. 3 shows that no fish below 17 cm were sampled at S.A.F.C.O.L. The majority of fish, in fact, were well above 20 cm. This biased sample was due to the size of the mesh of the nets used by the commercial fishermen. In South Australia the minimum legal mesh size during the study was 2 inches, compared with 2¼ inches in Victoria. Thomson (1957a) showed that, as far as yellow-eye mullet are concerned, any mesh from 2 inches to 3¼ inches allows the majority of the catch to be above the length of 20 cm.

Thomson (1957a) discusses the management of the yellow-eye mullet fishery both in Eastern and Western Australia and concludes that the existing management policies are effective in maintaining stocks. Whether this is also true for the "Coorong mullet" fishery cannot be determined yet due to lack of information, both biological and statistical. A study of the length/weight relationships is required together with estimations of fecundity and observations of the survival of fry and small immature fish. Statistics of the catch and fishing effort are also required before a more complete management programme can be suggested.

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